

AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Currently Amended) A photovoltaic device comprising a photovoltaic element, the photovoltaic element comprising:

a first conductivity type crystalline semiconductor layer;

a substantially intrinsic non-single-crystalline semiconductor layer formed on the first conductivity type crystalline semiconductor layer;

a transparent conductive oxide film formed on the substantially intrinsic non-single-crystalline semiconductor layer, wherein the transparent conductive oxide film has an arithmetic mean deviation of the profile of not more than about 2 nm;

a paste electrode formed on the transparent oxide film, wherein the paste electrode contains at least 60 percent by weight and not more than 100 percent by weight of epoxy resin;
and

an electric wire connected to the paste electrode, and

wherein a surface of the transparent conductive oxide film has irregularities with a height, and wherein a surface of a crystalline semiconductor layer has irregularities higher than the height of the irregularities on the surface of the transparent conductive oxide film.

~~A photovoltaic device comprising: a photovoltaic element including a transparent conductive oxide film having arithmetic mean deviation of the profile of not more than about 2 nm and a paste electrode, formed on said transparent conductive oxide film, containing at least a~~

~~metal material and a resin material, said resin material containing at least about 60 percent by weight and not more than about 100 percent by weight of epoxy resin, and having an electric wire connected to the paste electrode.~~

2. (Cancelled)

3. (Currently Amended) The photovoltaic device according to claim 1, [[2,]] wherein said photovoltaic element includes a second conductivity type non-single-crystalline semiconductor layer formed on said substantially intrinsic non-single-crystalline semiconductor layer, and

said transparent conductive oxide film is formed on said second conductivity type non-single-crystalline semiconductor layer.

4. (Currently Amended) The photovoltaic device according to claim 1, [[2,]] wherein said substantially intrinsic non-single-crystalline semiconductor layer includes a substantially intrinsic first non-single-crystalline semiconductor layer formed on the upper surface of said first conductivity type crystalline semiconductor layer and a substantially intrinsic second non-single-crystalline semiconductor layer formed on the lower surface of said first conductivity type crystalline semiconductor layer,

said photovoltaic element includes a second conductivity type third non-single-crystalline semiconductor layer formed on the upper surface of said first non-single-crystalline semiconductor layer and a first conductivity type fourth non-single-crystalline semiconductor layer formed on the lower surface of said second non-single-crystalline semiconductor layer, and

said transparent conductive oxide film includes a first transparent conductive oxide film formed on the upper surface of said third non-single-crystalline semiconductor layer and a second transparent conductive oxide film formed on the lower surface of said fourth non-single-crystalline semiconductor layer.

5. (Currently Amended) The photovoltaic device according to claim 1, ~~[[2,]]~~ wherein said resin material constituting said paste electrode contains at least about 75 percent by weight and not more than about 100 percent by weight of said epoxy resin.

6. (Currently Amended) The photovoltaic device according to claim 1, ~~[[2,]]~~ wherein said transparent conductive oxide film has arithmetic mean deviation of the profile of at least about 0.5 nm and not more than about 1 nm.

7. (Currently Amended) The photovoltaic device according to claim 1, ~~[[2,]]~~ wherein said transparent conductive oxide film contains SnO₂- added In₂O₃.

8. (Original) The photovoltaic device according to claim 7, wherein the content of Sn in said transparent conductive oxide film is not more than about 5 percent by weight.

9. (Currently Amended) The photovoltaic device according to claim 1, ~~[[2,]]~~ wherein

said resin material constituting said paste electrode contains urethane resin in addition to said epoxy resin.

10. (Currently Amended) The photovoltaic device according to claim 1, [[2,]] wherein said metal material constituting said paste electrode is Ag.

11. (Currently Amended) The photovoltaic device according to claim 1, [[2,]] wherein a contact angle of water with respect to a surface of said transparent conductive oxide film is at least about 40° and not more than about 74°.

12. (Previously Presented) The photovoltaic device according to claim 1, wherein a plurality of said photovoltaic elements are provided at a prescribed interval, and said paste electrode includes a first paste electrode formed on the upper surface of each said photovoltaic element and a second paste electrode formed on the lower surface of each said photovoltaic element,

wherein the electric wire has a first end connected to said first paste electrode formed on the upper surface of prescribed said photovoltaic element and a second end connected to said second paste electrode formed on the lower surface of another said photovoltaic element adjacent to said prescribed photovoltaic element.

13. (Currently Amended) A photovoltaic device comprising a photovoltaic element, the photovoltaic element comprising:

a first conductivity type crystalline semiconductor layer;

a substantially intrinsic non-single-crystalline semiconductor layer formed on the first conductivity type crystalline semiconductor layer;

a transparent conductive oxide film formed on the substantially intrinsic non-single-crystalline semiconductor layer, wherein the transparent conductive oxide film is provided with a surface having a contact angle of at least about 40° and not more than about 74° with respect to water;

a paste electrode formed on the transparent conductive oxide film, wherein the paste electrode contains at least a metal material and a resin material, said resin material containing at least about 60 percent by weight and not more than about 100 percent by weight of epoxy resin;
and

an electric wire connected to the paste electrode, and

wherein a surface of the transparent conductive oxide film has irregularities with a height, and wherein a surface of a crystalline semiconductor layer has irregularities higher than the height of the irregularities on the surface of the transparent conductive oxide film.

~~A photovoltaic device comprising: a photovoltaic element including a transparent conductive oxide film provided with a surface having a contact angle of at least about 40° and not more than about 74° with respect to water and a paste electrode, formed on said transparent conductive oxide film, containing at least a metal material and a resin material, said resin material containing at least about 60 percent by weight and not more than about 100 percent by weight of epoxy resin, and having an electric wire connected to said paste electrode.~~

14. (Original) The photovoltaic device according to claim 13, wherein

said photovoltaic element includes a first conductivity type crystalline semiconductor layer and a substantially intrinsic non-single-crystalline semiconductor layer formed on said crystalline semiconductor layer, and

said transparent conductive oxide film is formed on said non-single-crystalline semiconductor layer.

15. (Original) The photovoltaic device according to claim 14, wherein

said photovoltaic element includes a second conductivity type non-single-crystalline semiconductor layer formed on said substantially intrinsic non-single-crystalline semiconductor layer, and

said transparent conductive oxide film is formed on said second conductivity type non-single-crystalline semiconductor layer.

16. (Original) The photovoltaic device according to claim 14, wherein

said substantially intrinsic non-single-crystalline semiconductor layer includes a substantially intrinsic first non-single-crystalline semiconductor layer formed on the upper surface of said first conductivity type crystalline semiconductor layer and a substantially intrinsic second non-single-crystalline semiconductor layer formed on the lower surface of said first conductivity type crystalline semiconductor layer,

said photovoltaic element includes a second conductivity type third non-single-crystalline semiconductor layer formed on the upper surface of said first non-single-crystalline semiconductor layer and a first conductivity type fourth non-single-crystalline semiconductor layer formed on the lower surface of said second non-single-crystalline semiconductor layer, and

said transparent conductive oxide film includes a first transparent conductive oxide film formed on the upper surface of said third non-single-crystalline semiconductor layer and a second transparent conductive oxide film formed on the lower surface of said fourth non-single-crystalline semiconductor layer.

17. (Original) The photovoltaic device according to claim 13, wherein
said resin material constituting said paste electrode contains at least about 75 percent by weight and not more than about 100 percent by weight of said epoxy resin.

18. (Original) The photovoltaic device according to claim 13, wherein
said transparent conductive oxide film contains SnO_2 - added In_2O_3 .

19. (Original) The photovoltaic device according to claim 18, wherein
the content of Sn in said transparent conductive oxide film is not more than about 5 percent by weight.

20. (Original) The photovoltaic device according to claim 13, wherein
said resin material constituting said paste electrode contains urethane resin in addition to said epoxy resin.

21. (Original) The photovoltaic device according to claim 13, wherein
said metal material constituting said paste electrode is Ag.

22. (Previously Presented) The photovoltaic device according to claim 13, wherein a plurality of said photovoltaic elements are provided at a prescribed interval, and said paste electrode includes a first paste electrode formed on the upper surface of each said photovoltaic element and a second paste electrode formed on the lower surface of each said photovoltaic element,

wherein the electric wire has a first end connected to said first paste electrode formed on the upper surface of prescribed said photovoltaic element and a second end connected to said second paste electrode formed on the lower surface of another said photovoltaic element adjacent to said prescribed photovoltaic element.